

Micropump Fuel Mix Control for Novel Miniature Direct Methanol Fuel Cells, Phase I

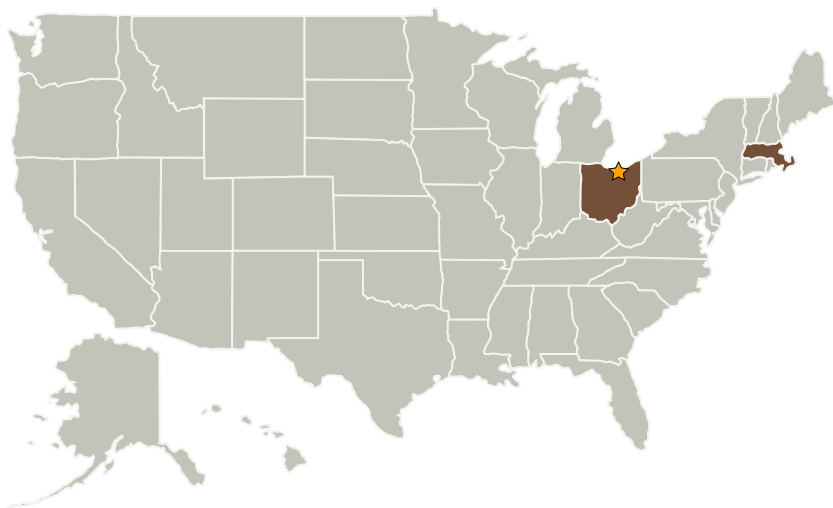
Completed Technology Project (2004 - 2004)



Project Introduction

The Energies and Power Densities of Direct Methanol Fuel Cells (DMFCs) are limited by the size and weight associated with the liquid pump, which must circulate the methanol/water fuel mixture so that 1) methanol and water can be added as needed, 2) heat can be removed, and 3) CO₂ can be removed. Automating these needs with appropriate control is difficult, especially under zero-gravity conditions. New design strategies are necessary with reduced overhead, if miniature DMFCs are to become a reality for Robotic terrestrial and Earth observation missions. The proposed work will demonstrate a DMFC with a means for continuous adjustment of water and methanol content in the anode fuel mixture of an air-breathing DMFC using piezoelectric micropumps. The micropumps are expected to be tolerant to zero-gravity and potentially will work more efficiently in the absence of gravity and thus provide an added benefit for DMFCs used in space.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Giner Electrochemical Systems, LLC	Supporting Organization	Industry	Newton, Massachusetts



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations

Massachusetts

Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Robert A Mcdonald

Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.4 Advanced Propulsion
 - └ TX01.4.3 Nuclear Thermal Propulsion